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ABSTRACT

The successful application of communication or educational technology in developing nations is dependent upon a favorable mix of planning factors and the more predominant contextual factors of local settings. Planning strategies should be adopted to search for those contexts that promise the best results from a rationally planned application of technology. This would avoid the planners' often irrational hope that technology can overcome the major social problems faced by a society, offering instead a useful tool for societies who have already attacked these problems. Examination of recent technology projects in developing nations, including the planning and implementation stages, indicates that these internal and external factors are the most likely to constrain the achievement of benefits: (1) criteria for successes are based on an implicit or explicit set of values; (2) in the past, judgment has been too restricted to internal efficiency standards; (3) contextual factors have largely been ignored; (4) equity as a criterion for success imposes its own criteria; and (5) a mix of contextual and planning factors is required. A bibliography of 27 references is included. (RAA)

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Success or Failure of Communication Technology in the Third World:

By What Criteria Shall We Judge?

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1. The Setting of the Problem

There are a number of ways to define success and therein lies the critical problem with evaluation. Whose criteria shall we use in taking the measure of success in major social intervention like education, health or nutrition? The judgment is no longer the domain of politicians alone but of researchers who have attempted through the development of a scientific discipline called evaluation to render these judgments of success or failure more "rational" and "objective", not to say "value free". The heart of the dilemma is that all social interventions are based on values and that the evaluator's choice of criteria for success or failure reflect certain social and political values.

I have been asked by Messers Eicher and Orivel, the hosts of our conference, to provide an overview of the evaluation results of a non-economic kind for the application of communication or educational technology* in Third World countries. Although I accepted their invitation to address this group, I would decline such an ambitious undertaking for a more modest one.** The theme I have chosen to address concerns the factors which contribute to success and failure in technology projects

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* Although there are purists in education and communication who disagree, I use the two terms communication technology and education technology interchangeably. I include not only hardware and software in the terms but the planning analysis and method of applying the technology as well.

** Evidence of this nature can be found in various sources cited in the references of this paper, but some specific ones are Schramm (1977); Spain, Jamison and McAnany (1977); Jamison and McAnany (1978); AED (1977); Audecam (1976); Mayo, Hornik and McAnany (1976); Mayo, McAnany and Klees (1975).

in Third World countries. It is the contention of this paper that the successful application and significant deployment of communication technology in formal and non-formal education* depends to a greater degree upon the contextual or strucural factors of the particular setting than on the planning and design factors.

The latter factors have been given increasing attention in the policy literature because professional planners either do not seem to realize how these contextual factors influence the outcomes of even the best designed projects, or they feel incapable of changing these factors when recognized (Mayo and Spain, 1977; Handcock, 1978). Likewise, evaluators often attend to the internal efficiency of a project and judge its success by criteria related to these factors rather than judging by the longer term external goals that are most influenced by structural factors.

Success in the evaluation literature can be defined in two ways: 1) The achievement of defined project goals or, 2) the positive consequences of the intervention whether defined or not. These latter have often been given the unfortunate name of "unintended" effects and thus introduce the whole problem of intentionality into the definition of objectives. (The problem of bias this raises has caused one well known evaluator, Michael Scriven, (1973) to redefine the evaluation undertaking as "goal free" in order to avoid trying to figure out what planners intended and looking at what the intervention has produced.) Regardless of whether we wish to agree or disagree with Scriven's approach, we need to pay serious attention to outcomes and not tie them too closely to stated objectives that may or may not remain constant over time or reflect the entire gamut of effort that a project has undertaken.

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* This would include regular school subjects and literacy as well as programs in health, family planning, nutrition and agriculture.

A careful distinction between what economists have called external and internal efficiency is called for in analyzying a project's outcome. This is roughly equivalent to what some evaluators (Suchman, 1967) have called the long and short term objectives of a project. To illustrate, an educational technology project using radio may be highly successful in training rural school children to learn mathematics but the graduates of rural primary schools may have no greater opportunity for employment than before. The system is internally efficient in teaching math and indirectly helps the flow-through rate, but externally it is not successful. A grade school diploma does not benefit the rural student for having earned it.

In the subsequent examination of some recent technology projects, I wish to review the planning and implementation stages to discover what factors both internal and especially external, seem to most constrain the achievement of benefits. On the basis of this examination I wish to draw some policy implications for the future planning and evaluation of communication and educational technology.

2. Factors for Success and Failure

a. Objectives

Before starting our reflection on some recent technology projects, we need to begin with a discussion of objectives. As I have mentioned before, objectives are a slippery reality. One of the common problems evaluators face is the dilemma of trying to define clear objectives for projects they wish to evaluate. The problems with objectives are multiple. First, objectives most often are not clearly defined and the imposition of clarity by the evaluator distorts the reality of what is happening in the interven-

tion, if not what is going on in the head of a project director.

Secondly, objectives change over time and should do so as the project adjusts itself to the reality of the context. Thirdly, the promoter of the project sells his idea on a political or long range criterion and the implementors and evaluators often concentrate on a short term educational goal. For example, Sesame Street was sold to the U.S. Congress as a way of reducing learning gaps between minorities and the middle class, but once funding was procured, the shorter term educational goals of "everyone's" learning (with, naturally, the middle class learning more) were emphasized (Cook et al, 1975).

A fourth problem about objectives is related to the third but is more complex: Projects have implicit as well as explicit consequences and these are not necessarily in the "intention" of the project planners. If consequences are defined as good, they are called objectives, if they are not defined as good, they are called "unintended" effects. It is taken for granted that no bad consequences or social costs are intended and therefore, these outcomes are often called "side effects" to indicate that only good effects are the "intended" ones. Now, as we all know, a benefit depends on who defines it as a benefit.

And herein lies the complexity of outcome evaluation or benefit measurement. What is good for one person may not be for another. An illustration may help: An educational technology project is intended to provide primary equivalency education to rural dropouts. The project "succeeds" in training fifteen per cent of this group at a low cost and with reasonable efficiency. As a consequence, the graduates all migrate to the urban areas to continue school or look for jobs. The individuals

may gain but the rural area may lose an asset. No one "intended" the migration away from the rural areas, in fact there may have been an explicit objective that primary schooling would help make students more productive farmers. Thus the net loss of the best people to the rural areas is a "side effect" or "unintended" outcome. But defined or not, it was inherent in the context of the project and it may have even been intended by a central planner who saw the need of more qualified labor for the modern sector. Then we have a conflict of objectives and of outcomes and we are squarely faced with the dilemma of evaluation, in determining whether an outcome is a success or a failure. Should we judge the project by how it benefited the urban or the rural sector? Benefit alone should not be a criteria of success; the question needs to be asked, whom does it benefit? Success for the urban sector may be at the expense of the rural sector.

b. Equity or who benefits?

Questions of equity have made the work of evaluation more difficult over the last decade. Development theory during this period has begun to emphasize distribution as well as growth (Chenery et al, 1974) and communication research has begun to examine not only how much information difuses among rural people but also whom this benefits (Rogers, 1976, McAnany, 1978). Many bilateral and multilateral aid institutions have adopted a conscious policy of directing their grants and loans at the poor majorities in the least developed countries and equity has become a major objective of programs and therefore a criterion of success.

Evaluation, if it is properly done, has several problems in the face of this drive toward equity. First, it should be called into a project at an early stage when objectives are being discussed, and one of its tasks may

well be to examine the assumptions that are implicit in proje[illegible] plans. For example, many rural radio projects try to program information for small farmers in order to help increase the productivity of their yields. There is an assumption that increased information can help improve yield for small farmers. But it may be that although the intention is good, the increase in information alone has no significant impact on yield and income but only when coupled with increased investments (Contreras, in progress; O'Sullivan, 1978). If an evaluator knew this before the project began, he or she might suggest that only larger farmers would benefit from such a program. Should the evaluator suggest not implementing a program that would benefit somewhat larger land owners (say from 2-5 hectares) and not the smallest farmers? It depends on how one defines the criterion of success and who benefits. Or if it is after a project has been implemented, how does an evaluator decide which farmers to call "small", and how to set the criterion for success? And should the evaluator, for example, point out that in the area 30 or 40 per cent of the population is landless laborers who benefit not at all from the project?

The more difficult and challenging task for the evaluator, however, is not in defining assumptions of projects or even of measuring a range of outcomes but of being able to explain <u>why</u> the results turned out as they did. This is what Suchman (1967) called "process evaluation" or the examination of those factors that help explain why a project succeeds or fails. As he points out, we are most often interested in why a project does <u>not</u> work in order to improve the current effort or improve planning for future projects.

I wish to spend some time during this talk examining some recent projects to point out what factors (whether planned or not) significantly influenced

the outcomes of those projects.

3. "Successful" Projects

According to the thesis proposed above, the factors that most account for the successful application and widespread use of technology in Third World countries are contextual and not planning ones. Let us examine briefly some examples of what are generally considered "successful" uses of communication to test the viability of the assertion and to identify and discuss some of these factors.

a. Development communication

In the area of development communication, the Tanzanian radio study campaigns (1969-1975) are widely agreed to have been "successful". The basic criterion of success in this case is sheer size. Beginning with only a few hundred people, by 1973 the campaigns on health involved about 1.5 to 2 million adults in its activities. The evaluation of this campaign (Hall and Dodds, 1977) suggested that not only did audiences participate in weekly discussion meetings but learned about health practices and participated in actions, including the digging of 750,000 latrines. A second example of a successful experiment in communication for development is the Basic Village Education project now concluding its work in Guatemala. Radio messages, sometimes accompanied by a monitor for discussions and sometimes as well by an agronomist, seem to have influenced small farmers in an eastern province of the country to have adopted significantly more innovative agricultural practices and to have increased productivity as a consequence than control farmers (AED, 1977).

b. Inproving quality in formal school

The use of educational media to improve the quality of instruction within the formal school setting can be illustrated by two examples, the El Salvador instructional television system (Mayo, Hornik and McAnany, 1976) and the Radio Mathematics Project of Nicaragua (Suppes, Searle and Friend, 1978). In the first, a national educational reform adopted television as the centerpiece for change in curriculum, supervision, administration etc. for seventh through ninth grades. Subsequent evaluation indicated an improvement in general ability skills attributable to television and a "catalytic" effect of television in promoting system changes. The Radio Mathematics Project is a pilot test of teaching mathematics by radio in a rural province of Nicaragua using daily thirty minute radio programs with active student responses. Results show large and significant gains of experimental over control students.

c. Extension of schooling or distance learning.

In the area of extending schooling to populations without opportunities of enrolling in regular schools, three projects may illustrate what is often referred to as open or distance learning. The Mexican Telesecundaria was less "open" and more structured than the projects that have modeled themselves after the British Open University, but it is an example of the extension of schooling. It provided classes for students in grades 7-9, especially in the rural areas, where no regular secondary schooling was available. This was accomplished with television carrying the major instructional tasks with accompanying texts and a primary teacher as a class monitor. Results of an evaluation (Mayo, McAnany and Klees, 1975) showed Telesecundaria students doing equally as well as regular

secondary students in a system that cost less than the traditional one. The Santa Maria Radio School in the Dominican Republic is a national primary equivalency system based on a distance learning model (individual radio reception, written assignments, weekly tutorial meetings with a teacher, etc.) that has enrolled about 20,000 students and graduated about 11 or 12,000 a year (1972-75). According to the results of an evaluation (White, 1976), Radio Santa Maria provides rural youth with an education equivalent, or superior to traditional means and at a cheaper cost. A final example that I draw from a series of distance learning studies being sponsored by the World Bank, but not yet published (Perraton, 1978), is the Korean Air Correspondence High School. In this project senior high school students study by radio, printed texts and correspondence. This provides about 22,000 students with an opportunity of finishing a high school degree while working. The preliminary results (Lee, Futagami, Braithwaite, 1978) are encouraging in terms of efficiency and cost considerations.

I do not expect my listeners to be able to understand much about the details of these projects from what I have said. The purpose is rather to cite some generally well known examples of "successful" communication technology projects for the purposes of illustrating two points in the subsequent discussion: to identify what factors in these projects, in both planning and implementation stages, seem most likely to have accounted for this success; secondly, to determine which values were operating in the evaluator's criteria of success.

4. Factors Contributing to Success

a. Contextual factors

Let us begin with what seems so obvious as to be almost perfunctory in the literature on development projects. This is the political commitment of a government to change and development. The commitment means certain priorities will be held and that choices will be made according to them. Thus the Tanzania government chose to put emphasis on rural development over urban industrialization and the radio study campaigns which were geared to rural areas had full government backing and collaboration. But there is an added element about political commitment that is difficult to measure and often does not enter into assessments of projects and that is a kind of charismatic support that leadership can lend to the work of project personnel.

The Tanzania radio study campaigns have been much quoted in development communication literature as being a model for other countries to deal with their rural development needs. But the major difference between Tanzania and many other countries is that it had an effective political commitment to rural development that meant priority allocation of resources to such a purpose. When rural communication projects fail in other countries at least one factor to examine is to what extent the government is really committed to rural development. The primary factor which influences change in rural areas is a political commitment to that change, without which education and communication, however well planned, can only have a minimal impact. Cuba over the past fifteen years has almost totally eradicated many of the direct indicators of under-development: severe malnutrition, illiteracy, poor health and large gaps between city and

countryside. What this indicates is a governmental commitment to goals of better health and educational services for everyone and the allocation of resources to that purpose.

But we do not need to look at the total political commitment to fundamental change evidenced in countries like Cuba and Tanzania. On a more limited level, this same commitment is often manifested in a leader who has enough political influence and charisma to get a project started and institutionalized before she or he leaves the project. Such a factor is often left unmentioned in evaluations because it cannot neatly be quantified and yet in the political realities of projects, we recognize that it is a critical factor that helps projects succeed. We may mention the crucial role that Walter Beneke as Minsiter of Education played in the Salvadoran ITV project. President Nyrere in Tanzania accounts not a little for the enthusiastic response that almost two million persons gave the radio campaigns of 1973 and 1975. The early years of the Mexican Telesecundaria were much influenced by its founder and leader who managed through political influence to overcome opponents and get the project's secondary degrees recognized. Finally, one wonders to what degree the success of Radio Santa Maria is reflected in the vigorous leadership exerted by its director who not only brought an efficiency and drive to the project, but a political shrewdness that allowed the private organization to get its primary degrees accepted officially.

Another set of factors that seems critical in explaining the success of some of these projects is the motivation of the target audience. The motivation and political mobilization of Tanzanian peasants have already been

referred to. El Salvador built educational reform and an ITV system on the basis of peoples' expectations of and demands for more education. The distance learning examples in Mexico, the Dominican Republic and Korea all tapped into strong motivation to get further education. In the first two projects this education meant probably migrating to the city and finding a job; in the latter project it meant a raise in salary for young Korean workers. The projects, for the most part, did not have to create their own enthusiasm. They offered people something that seemed useful and they could build upon the base of widespread interest.

b. Planning factors

The factors mentioned thus far have been external or contextual factors, but we cannot overlook the influence of internal factors as well, such as the efficiency and planning capabilities of project personnel. The Korean and Dominican, as well as the Nicaraguan and Guatemalan, projects manifest a coherence and efficiency in planning and organization that undoubtedly contributed a great deal to their effectiveness. The organizational structure of each, however, shared an important common element: none was part of the large government bureaucracy that usually diminishes the efficiency of even well planned projects. Radio Santa Maria was a church related organization run by a remarkably efficient director working with a small central staff. The Korean Radio High School was attached to a special R and D group in the Ministry of Education. The Nicaraguan Radio Math and the Guatemalan Basic Village Education projects are experiments controlled by some highly qualified expatriates but not operating as yet as fully governmental agencies. The problem that pilot projects like the latter two have is precisely the transition from an experimental to a fully operational stage.

A second element of planning in these projects that has helped their effectiveness is the attention paid to the content and the design of the messages. The Basic Village Education and Nicaraguan Math projects have devoted a significant proportion of their budgets to such a purpose. The Guatemalan project first studied the agricultural cycle and adapted carefully researched radio messages to the changing needs of farmers, from soil preparation through harvest. Radio Math performed R and D research on each year of the curriculum through continuous feedback from students. The Korean Radio High School and El Salvador's ITV also put emphasis on careful content preparation but in a much less intensive form than the two experimental projects in Central America.

A final item that should be noted about the internal factors that help to explain the success of some of these programs is the learning model that underlies them. Radio Santa Maria and the Radio Math projects have an active learning approach in which students respond to the radio message while it is being broadcast. There can be no doubt that this has contributed significantly to learning (Suppes, Searle and Friend, in press, White, 1976). Tanzania's discussion method following radio broadcasts tried to promote the contribution of each member of the group to problem clarification and to downgrade the dominant role that the discussion leader often assumes. Evaluation showed an increase in farmers as discusison leaders over teachers in that role from 1971 to 1973, and a larger number of people contributing to the discussion in the group (Hall and Dodds, 1977).

We have discussed both contextual and planning factors that contribute to the success of seven technology projects. It is difficult, if not impossible, to sort out the exact amount of variance in the outcome

variables that are due to these and to other factors. What is more important is that we begin to recognize that significant factors that may not be easily measureable do intervene significantly in the level of success or failure that we have measured with our traditional evaluation instruments.*

5. Criteria in Judging "Success"

We have promised to return to the problem of how one chooses the criteria of success in a project. Our point is that however scientific or objective our evaluation methodolcgy may be, we constantly rely upon a value base,either our own or some one else's,in choosing what criteria to judge a project by. We will use the set of seven projects we have discussed as a basis for exploring this last point in a little more depth before concluding.

In a review of educational technology evaluations published several years ago, two critics were asked to comment on the findings of these studies (Carnoy and Levin, 1975). Their criticisms were that the evaluations were positively biased in two ways: 1) all of the evaluations were done by those who are in favor of educational technology or work for agencies that are thus inclined and give a positive interpretation (or "benefit of the doubt") to results, and 2) the evaluations narrow the scope of study to items on the agenda of the sponsor. The critics admitted that for their part they were negatively biased toward educational technology and that had they done the evaluations they would have found quite different results. Such

* Administrative histories although not quantifiable often help to illuminate how or why a project has performed the way it has. Two examples from technology projects are Mayo and Mayo (1971) on El Salvador, and Grant (1977) on the Ivory Coast.

an "adversary" approach to evaluation may make some people uncomfortable, but it provides a healthy way of controlling bias in research and helps to enlarge the perspective from which technology is evaluated. Some of the concerns of these and other critics of technology will be explored briefly below.

One key point to clarify in discussing the outcome of technology projects is to what extent we concentrate our evaluation on internal efficiency and effectiveness or on external efficiency and longer term benefits. I have illustrated this point above and have explored it in more depth elsewhere (Lenglet and McAnany, 1977). I would argue that most of the judgments of success of the projects under discussion are based on shorter term benefits of internal efficiency and not on longer term, external efficiency benefits. There are several reasons for this and several consequences which we shall explore in the subsequent pages.

It is clear that because the Basic Village Education and Radio Math Projects are experiments they are judged by a different set of criteria from other interventions. The problem they face is whether they can or will be expanded to operational systems. Although the criteria for the evaluation were rigorous and the evidence carefully gathered, the control exerted over the environment by implementators, as with all experiments, may prove the greatest obstacle to their translation into functioning systems. What the experiments seem to demonstrate is that under special circumstances radio can be used successfully to impart agricultural knowledge or teach mathematics but not that it will do so when more usual circumstances prevail and the context is able to exert a more typical influence on outcomes.

The El Salvador TV project has been carefully evaluated (Mayo, Hornik and McAnany, 1976), but there are a number of other criteria that the evaluation

did not take into consideration that would qualify the term "success". One argument raised by critics is that even though ITV in El Salvador achieved shorter term learning goals, such longer term goals of the Educational Reform as providing more qualified labor for an expanding industrial sector was not acheived. Another argument is that success must be judged in the long term when the initial enthusiasm has worn off and problems have had an opportunity to emerge. Finally, the longer term study of ITV in El Salvador might show its bureaucratization and increasing inefficiency and lack of flexibility (Werthein, 1977).

One might wish to study the Dominican Radio Santa Maria, not as White did, in comparison with traditional adult education, but for its effects on increasing the rural exodus. White's study suggests that a large portion of Santa Maria students plan to leave the rural areas for the city at the end of eighth grade. The same way of looking at the Telesecundaria in Mexico could be adopted in evaluating the outcomes of that school system. The efficiency of these two systems in producing graduates needs to be balanced against the social costs of the rural areas from which the best human resources are being drained.

The Radio High School of Korea has not yet studied the effect of background characteristics on entering or remaining in its courses. Such a study may well reveal that the project, although it provides further learning opportunities for some, does not do so for all who wish or demand it. It may only make a small contribution to a limited group and widens gaps with a much larger remainder who cannot take advantage of the opportunity.

Finally, the Tanzanian radio campaigns have been judged successful on

the basis of the two most recent campaigns in 1973 and 1975. The influence of historical circumstances in promoting national enthusiasm may have contributed significantly to the large participation. One would need to study several more campaigns to see whether the approach has been institutionalized enough to carry on in changing national circumstances before declaring the campaigns successful and certainly before promoting their usefulness for other countries with very different circumstances.

Critics of technology lodge several arguments against it and demand that it be judged by larger standards. They say that it is more costly than has been claimed; that it is a centralizing and controlling force in educating people according to the dominent ideology of the country and leaves the teacher as a mere adjunct with little freedom of action; that it does not solve the structural problems that plague most Third World countries; that the degrees from distance learning systems are not of equal value in obtaining jobs even if they may provide adequate cognitive skills; and finally of creating the impression that something is being done for the poor without having to deal with serious change (e.g. Arnove, 1976). They further argue that evaluations of technology projects choose criteria that do not take these elements into consideration.

What these points call for in some cases is a widening of criteria by which technology is judged, like those involving longer term outcomes that are often left unmeasured. In other cases we need to carefully monitor the impact of structural factors on even short term outcomes (Contreras, in progress). In still other cases we need to admit that neither technology nor education is likely to change those basic structural factors. Still they need to be taken into consideration at the planning stages of projects so that more modest goals can be set and more realistic criteria for outcomes may be utilized.

6. Conclusions

What major conclusions might be drawn from the previous discussion? First, that the criteria we choose to measure success by, however necessary the choice, are based on an implicit or explicit set of values. As a consequence of such a choice the focus of attention in assessing outcomes will be restricted and exclude considerations of other possible costs and benefits. Second, that in the past we have judged too much by internal efficiency standards and not given sufficient attention to the longer range implications of educating people with technology. Third, that we have not yet paid sufficient attention to intervening contextual factors that greatly affect both short and long term outcomes and overshadow the effects of national planning and organizational efforts, although that latter do make substantial contributions when the effects of structural factors are somewhat mitigated. Fourth, that equity as a criterion of success imposes a somewhat different set of criteria for benefits than what has been used in the past. Equity also will probably impose greater costs since it is often more difficult to reach, educate and employ those whom society's structures have placed toward the bottom of the scale. Finally to return to my basic thesis of the preponderance of contextual over planning factors. I do not wish to give the impression of a necessary contradiction between the two. Rather I see the most successful application of communication or educational technology when both contextual and planning factors are favorable. Therefore, I would suggest that a planning strategy be adopted to search for those contexts that promise the best results from an application of a rationally planned use of technology. We would thus avoid the irrational hope often manifested by planners that technology can overcome the major social problems faced by a society and rather be able to use technology as a tool for helping societies who have attacked these problems and are looking for a tool to help them.

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